DEVELOPMENT AND APPLICATION OF PEPTIDE NUCLEIC ACIDS (PNA) FOR THE RAPID IDENTIFICATION OF MICROORGANISMS BY FLUORESCENCE *IN SITU* HYBRIDIZATION (FISH)

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Fluorescence *in situ* hybridization (FISH) is a well-established technique that is used for a variety of purposes, ranging from pathogen detection in clinical diagnostics to the determination of chromosomal stability in stem cell research. The key step of FISH involves the detection of a nucleic acid region and as such, DNA molecules have typically been used to probe for the sequences of interest. However, since the turn of the century, an increasing number of laboratories have started to move on to the more robust DNA mimics methods, most notably to peptide nucleic acids (PNA). In this work, we report the development of four new probes that target well-known human pathogens [e.g. 1]. The method has been optimized for the detection of these pathogens in less than 5 hours by epifluorescence microscopy with high specificity and sensitivity. Additionally, counter-staining with 4′,6-diamidino-2-phenylindole (DAPI) allowed discrimination of the pathogens in mixed populations of contaminants in a variety of microenvironments.

These new probes will act both at the level of population well-being, by providing faster and more efficient methods for the detection of infectious agents and at the level of worldwide economy, by bringing down patient care associated costs (mainly those related with less-than-optimum antibiotic usage and median length of hospital stay for each patient)

References:

[1] Guimaraes N, Azevedo NF, Figueiredo C, Keevil CW, Vieira MJ. Development and application of a novel peptide nucleic acid probe for the specific detection of *Helicobacter pylori* in gastric biopsy specimens. J Clin Microbiol **45(9)** (2007) 3089-3094.